

TERASCALE COMPUTING SYSTEM

PROGRAM SOLICITATION

NSF 00-29

**DIRECTORATE FOR COMPUTER AND INFORMATION SCIENCE AND
ENGINEERING**

DEADLINE DATE: *APRIL 3, 2000*



NATIONAL SCIENCE FOUNDATION



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SUMMARY OF PROGRAM REQUIREMENTS

GENERAL INFORMATION

Program Name: Terascale Computing System

Short Description/Synopsis of Program:

The purpose of this solicitation is to provide terascale computing capabilities for support of U.S. science and engineering research. The National Science Foundation will financially assist the establishment of a single, new, terascale computing system in FY2000 to enable U.S. researchers in all science and engineering disciplines to gain access to leading edge computing capabilities. The system will be balanced in terms of processor speed, memory, communication and storage systems. It will also include system software comparable to that on other high-performance systems, including system administration, job scheduling, and compilers and programming tools. If funds become available, an additional system may be situated elsewhere in FY01, with both systems' capabilities upgraded in subsequent years.

Cognizant Program Officer(s): Dr. Stephen Elbert, Program Officer, Room 1122, Division of Advanced Computational Infrastructure and Research, telephone (703) 306-1963, e-mail: selbert@nsf.gov; Dr. Richard Hirsh, Deputy Division Director, Room 1122, Division of Advanced Computational Infrastructure and Research, telephone (703) 306-1970, e-mail: rhirsh@nsf.gov; Dr. Robert Borchers, Division Director, Room 1122, Division of Advanced Computational Infrastructure and Research, telephone (703) 306-1970, e-mail: rborcher@nsf.gov.

Applicable Catalog of Federal Domestic Assistance (CFDA) No.: 47.070

ELIGIBILITY

- ◆ Limitation on the categories of organizations that are eligible to submit proposals: **Any U.S. organization with prior experience in providing leading edge computational capability to a wide range of users, including a Federally Funded Research and Development Center, may apply. However, since open access for all users must be assured, any organizational restrictions to access will be disqualifying.**

- ◆ PI eligibility limitations: **No individual may be Principal Investigator or Co-PI on more than one proposal.**

- ◆ Limitation on the number of proposals that may be submitted by an organization: **No organization may submit more than one proposal.**

AWARD INFORMATION

- ◆ Type of award anticipated: **Cooperative Agreement**
- ◆ Number of awards anticipated in FY 00: **one award**
- ◆ Amount of funds available: **\$36 million for the computing system (including hardware, software, and maintenance), plus additional funds for operating costs.**
- ◆ Anticipated date of award: **September 2000**

PROPOSAL PREPARATION & SUBMISSION INSTRUCTIONS

◆ **Proposal Preparation Instructions**

- Letter of Intent requirements: **None**
- Preproposal requirements: **None**
- Proposal preparation instructions: **Standard NSF Grant Proposal Guide instructions plus requirements specific to this solicitation (see proposal preparation and submission instructions).**
- Supplemental proposal preparation instructions: **None**
- Deviations from standard (GPG) proposal preparation instructions: **The project description section has a limit of 25 pages; no page limit on budget justification; two separate budgets (computing system and operations) submitted with signature page.**

◆ **Budgetary Information**

- Cost sharing/matching requirements: **None**
- Indirect cost (F&A) limitations: **None**
- Other budgetary limitations: **None**

◆ **FastLane Requirements**

- FastLane proposal preparation requirements: **FastLane use required.**
- FastLane point of contact: FastLane User Support at (703) 306-1142, or fastlane@nsf.gov

◆ **Deadline/Target Dates**

- Full Proposal Deadline: **5:00 PM local time, April 3, 2000 (FastLane)**

PROPOSAL REVIEW INFORMATION

- ◆ Merit Review Criteria: Standard **National Science Board approved criteria plus additional criteria delineated in this solicitation.**

AWARD ADMINISTRATION INFORMATION

- ◆ Grant Award Conditions: **GC-1 and CA-1**
- ◆ Special grant conditions anticipated: **Managed for the use of the national community in cooperation with the Division of Advanced Computational Infrastructure and Research (ACIR). Title to the equipment purchased as a result of this solicitation vests in the Awardee. The NSF may, at any time prior to 120 calendar days after the expiration date of the Cooperative Agreement, direct the Awardee to transfer title to the equipment to the Federal Government or a third party named by the Federal Government.**
- ◆ Special reporting requirements anticipated: **The cooperative agreement will provide details on specific requirements.**

BACKGROUND

NSF has a long history of support for high-performance computing, beginning with the Supercomputer Centers program established in 1985. The Partnerships for Advanced Computational Infrastructure (PACI) program replaced the Supercomputer Centers program in 1998. The PACI program added emphasis on the coupling of computational and computer science in order to more effectively exploit the emerging capabilities of scalable parallel systems, high performance networking and high bandwidth, large capacity mass storage systems.

Due to the increased computational capability that is now available, computational science is currently experiencing a revolution in its ability to solve research problems. The recent demonstration of computers with speeds of a teraflop or more (10^{12} floating point operations per second) has directed

attention to important fundamental science and engineering problems which are not amenable to solution with current systems, but would be accessible to terascale range computation. The President's Information Technology Advisory Committee (PITAC) final report, Information Technology Research: Investing in Our Future (<<http://www.ccic.gov/ac/report/>>), released on Feb. 24, 1999, found that:

- *“high-end computing is essential to science and engineering research”*
- *“both for the sake of fundamental scientific research and to enable applications to benefit from the research, the research community needs access to systems at the leading edge of capability.”*

The report goes on to state that:

If the United States is to continue as the world leader in basic research, its scientists and engineers must have access to the most powerful computers. Therefore, the Committee recommends that the Federal government continue to provide these computing systems to the research community through major, shared-facility centers. To increase long-term, fundamental research across all science and engineering disciplines, the first priority should be to increase the computing capacity of the centers that can best serve the entire research community.

PROGRAM DESCRIPTION

The purpose of this solicitation is to generate proposals for a terascale computing system in support of U.S. science and engineering research. This system will go beyond the simple evolution of existing systems in order to address the leading-edge requirements of the computational science and engineering research community. Fundamental research in computer science will be necessary to achieve truly effective use of this national resource.

In FY2000, the National Science Foundation will financially assist the establishment of a single new terascale computing system to enable US researchers in all science and engineering disciplines to gain access to leading edge computing capabilities. The system will be balanced in terms of processor speed, memory, communication and storage systems. It will also include system software comparable to that on other high-performance systems, including system administration, job scheduling, and compilers and programming tools. It is expected that by February 2001 at least a portion of the system will be installed and in either full production or friendly user mode with an acceptable timetable in place for completion of the full production system. Pending availability of funds, an additional system may be situated elsewhere in FY01 with both systems' capabilities upgraded in subsequent years.

This, and any subsequent, terascale systems will be part of the portfolio of resources provided by the Advanced Computational Infrastructure (ACI) program, and will supplement the capabilities which will continue to be available through the PACI partnerships. It is the expectation of the NSF that these systems will be fully coordinated with the resources and activities of the existing PACI partnerships,

such as, but not limited to, user support and consulting. As such, it will be managed for the use of the national community in cooperation with the Division of Advanced Computational Infrastructure and Research at NSF. Allocations for use of this machine, like all other major ACI resources, will be made through the National Resource Allocation Committee (NRAC).

The goal is to provide the most computational capability for the broadest community for the available funds. Recognizing that systems of this scale are *not* commodity, off-the-shelf items, achieving this goal will require a joint development effort among the host organization, the manufacturer, the PACI partnerships and other possible collaborators. The problems to be resolved in making a system of this scale broadly usable, in an effective manner, are complex. Having a large community of collaborative expertise available to address the multitude of problems that are likely to occur will enhance the chances for success.

The expertise needed to provide this capability falls into three categories:

- The technical skill of the vendor/supplier providing the system. There will need to be a close working partnership between the proposer and the vendor/supplier. Any history of previous interactions between the proposer and the vendor/supplier should be documented in the proposal.
- Since initially this terascale system is expected to be difficult to use, the expertise of the computer science community is essential to research and develop the required improvements in operating systems, compilers, debuggers, software environments, algorithms, etc.
- Finally, a closely connected group of large-scale users from various fields is necessary, since the ultimate purpose for acquiring the machine is to enable the discovery of new knowledge in various realms of science and engineering. This group will provide the hands-on testing of the terascale system, and provide feedback on performance and usability to the experts in the two previous categories, while pushing the scientific frontiers of their discipline with leading edge computation.

NSF does not intend, with this solicitation, to start a freestanding supercomputer center. A successful proposal will be integrated into the existing ACI program <<http://www.cise.nsf.gov/acir/>> and take full advantage of NSF's existing investments in that program. Within this context, proposals submitted in response to this solicitation must indicate which elements of the terascale system can be expected to be integrated and which ones would not be integrated into the existing ACI program. Agreements with the existing program partners will be negotiated before or after the selection is made. Furthermore, the following points must be addressed in the project description:

1. "Systems" issues:

- The ability to provide the most effective computational capability to the broadest range of research community requiring leading edge, terascale, computational capabilities. Is the configured system "balanced" in terms of processors (number and speed), memory and interconnects so that it can achieve this goal? What is the operating system and instruction set

architecture? Is the system sufficiently scalable and what is (are) the future upgrade path(s) available to continue to improve machine performance for the next three to five years? What experience does the proposing organization have in meeting the high-end computing needs of the community on a cutting-edge system?

- The availability of system software and tools to effectively use the computational capabilities of the hardware. While it is to be expected that software for leading-edge machines will be somewhat immature due to lack of testing platforms, it is vital that basic system services be sufficient for users and system managers to accomplish their work. Proposers must include a description of how their system will respond to these needs in the first three years of operation. Sample requirements can be found in “Guidelines for Specifying HPC Software” (available at <http://www.nacse.org/distributions/HPCreqts/>) or in printed format as technical report 99-80-01 from the Department of Computer Science, Oregon State University). Although the guidelines are stated as UNIX capabilities, this solicitation does not require any particular operating system; non-UNIX systems should prepare a description of roughly comparable capabilities. Features of particular importance include the file system, compilers (including Fortran 95, C, C++, and OpenMP), message-passing libraries, other libraries (including numerical and data conversion), debugging tools, application tuning tools, resource management, and job scheduling and accounting.
- The ability to call on a wide range of expertise essential for addressing the challenging system integration problems expected to arise. It is expected that there will be initial difficulty with the terascale system that can only be attacked in cooperation with the national high performance computing community. The expertise to fill these needs may come from vendor, academic and/or government partners. Proposals should make clear their previous associations with these partners. The breadth of knowledge, depth of interaction, and technical abilities of partners will all be considered. This knowledge is particularly important in providing support for more advanced programming paradigms (e.g. High Performance Fortran, problem solving environments) and tools (e.g. performance visualization, parallel debuggers) than the HPC software guidelines mentioned above suggest. However, substantial outside expertise may also be needed in the system software and tools areas mentioned above.
- Links to a variety of applications. The proposal should demonstrate an ability to support a variety of applications representing the broad community of potential NSF users. The choice of applications should be justified in terms of their scientific merit and their ability to contribute to the development and future use of the system. Since a particular set of applications can influence the architecture and “balance” of a system, the features of applications influencing the configuration of the machine should be fully explained and justified. Some possible parameters to be considered include total number of processors, speed and architecture of individual processors, number of processors sharing the same access to memory, amount of memory, size and number of caches, inter-processor or inter-node bandwidth and latency, communications topology, amount of secondary storage, and amount of archival storage.

- The basis for the amount of on-line and archival storage being proposed. Terascale systems are expected to produce many terabytes of data. How will these data be handled in the broad context of the overall ACI program? How will data integrity be maintained? What backup procedures and schedules will be provided and how will they be implemented?
2. The history of the vendor/supplier in supplying high-performance systems and the likelihood of continued success in this area.
- Significant risks are associated with the installation and implementation of a system of this scale. Recognizing that experience is one of the best ways to reduce risk, the proposal should document the vendor/supplier's history with large-scale systems (hardware and software) such as any systems proposed or delivered to *other* large sites (academic and/or government).
 - Experience has demonstrated that the successful deployment and operation of a system of this scale must be a joint effort of the vendor/supplier, computer scientists and computational scientists. Given the scope of the problems likely to be encountered in deploying systems of this magnitude, any history between the proposer and the vendor/supplier providing the system or its components should be documented.
3. A management plan for the terascale system must be provided. This plan must:
- Describe how the new terascale system will be integrated into the existing ACI program <<http://www.cise.nsf.gov/acir/>> to both take advantage of existing expertise and to minimize operating costs.
 - Discuss user access to the system, including early access, and alpha and beta testing, as well as management of the steady-state production operation. The proposal should also discuss the availability of dedicated time on the system for both science & engineering applications and systems testing, and how much time will be spent moving users on and off the system, or reconfiguring it for dedicated use.
 - Describe the qualifications of the Principal Investigator(s) on the proposal with regard to his/her ability to manage a resource for national use.
 - Describe plans for the physical facility including schedule implications of providing computer-ready space, including floor space, power, and cooling, for the initial machine and its supporting hardware allowing for appropriate possible growth.
 - Ensure, when the initial system is delivered, the availability of at least two independent high bandwidth (about a gigabit/second) network connections between the facility and one or more appropriate national backbones, e.g., vBNS, or Abilene.

- describe any similar systems being installed by the vendor elsewhere and how these activities might interact.

BUDGET

This solicitation is intended to fund the cost of acquiring, installing, maintaining and operating the terascale system. System acquisition and operating costs must be detailed separately in the proposal. Both the performance and cost of the system, including the cost of operation, will be important considerations in the review. To simplify the evaluation, three separate budgets (acquisition, operations and summary total), following the NSF Form 1030 format with accompanying justifications, must be provided. The budgets must address the following:

- Costs associated with system acquisition should be detailed and justified in the hard copy acquisition budget. Hardware and software maintenance over the estimated three-year useful life of the system should be included in the purchase agreement.
- Operating funds, as necessary, represent costs above that of system acquisition and should be detailed and justified in the hard copy operations budget.
- The total cost should be included in the electronic budget as part of the FastLane proposal submission. Any cost sharing proposed should be included on Line M of this summary budget.

The two separate budgets detailing system acquisition costs and operating costs must be submitted in hard copy to NSF with the signed cover sheets (see proposal due dates, below). These budgets must also be summarized in tables in the budget justification section of the proposal.

ELIGIBILITY

Any U.S. organization with prior experience in providing leading edge computational capability to a wide range of users is eligible to apply. Because this is a special national research program for which the Foundation bears special responsibility, Federally-Funded Research and Development Centers may propose either individually or jointly with other entities. However, open access for all users must be assured; any organizational restrictions to access will be disqualifying. Synergistic collaboration among researchers and collaboration or partnerships with industry or government laboratories is encouraged where appropriate.

AWARD INFORMATION

Funding Levels and Duration of Award

A total of \$36 million for the computing system (including hardware, software and maintenance), plus additional funds for operating costs is available for this competition. NSF expects to make this award in September 2000. This award will be for three years with an option to extend the award pending the availability of funds and satisfactory completion of the initial award period. Pending availability of funds, an additional system may be situated elsewhere in FY01 with both systems' capabilities upgraded in subsequent years.

Program Management

The terascale system will be managed by the Awardee in cooperation with ACIR in the context of the ACI program. The system to be put in place represents the high end of the capability provided by the ACI Program, but will be coordinated with all other resources available through ACI. The existing National Resource Allocations Committee that is responsible for large allocations on current PACI systems will manage the allocation of the usage on the terascale system.

Budget and Cost Sharing

A total of \$36 million for the computing system (including hardware, software and maintenance), plus additional funds for operating costs is available for this competition. There is no cost sharing requirement for this solicitation. Vendor discounts will not be considered as cost sharing. Any proposed cost sharing must be shown on line M of the summary proposal budget (NSF Form 1030), consistent with the GPG.

Title to Equipment

Title to the equipment purchased as a result of this solicitation vests in the Awardee. The NSF may, at any time prior to 120 calendar days after the expiration date of the Cooperative Agreement, direct the Awardee to transfer title to the equipment to the Federal Government or a third party named by the Federal Government.

PROPOSAL PREPARATION & SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions.

Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *Grant Proposal Guide* (GPG), NSF 00-2, except as noted below. The complete text of the GPG (including electronic forms) is available electronically on the NSF Web site at: <<http://www.nsf.gov/>>. Paper copies of the GPG may be

obtained from the NSF Publications Clearinghouse, telephone 301.947.2722 or by e-mail from pubs@nsf.gov.

Proposers are reminded to identify the program announcement number (NSF 00-29) in the program announcement/solicitation block on the NSF Form 1207, "*Cover Sheet for Proposal to the National Science Foundation*." Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

GPG exceptions:

- The project description section of the proposal has a limit of 25 pages.
- The budget justification section has no page limit.
- A budget for total funds requested from NSF for computing system acquisition and operations should be submitted via FastLane. Two separate hard copy budgets reflecting separate costs for system acquisition and operations should be submitted with the signed cover sheets. The acquisition and operations budgets must also be summarized in tables in the FastLane budget justification section.

B. Proposal Due Dates.

The proposal **MUST** be submitted by 5:00 PM, local time, April 3, 2000 via FastLane. Copies of the signed proposal cover sheet must be submitted in accordance with the instructions identified below.

Submission of Signed Cover Sheets. For purposes of this solicitation, the signed proposal Cover Sheet (NSF Form 1207) must be forwarded within five days after the proposal is submitted. Two separate NSF Budget Form 1030s should also be forwarded to NSF at the same time. They should detail the system acquisition cost and the cost to operate the system. These pages should be forwarded to this address:

National Science Foundation
ACIR, Room 1122
4201 Wilson Blvd.
Arlington, VA 22230

A proposal may not be processed until the complete proposal (including signed Cover Sheet and the acquisition and operations budgets) has been received by NSF.

C. FastLane Requirements.

Proposers are required to prepare and submit proposals using the NSF FastLane system. Detailed instructions for proposal preparation and submission via FastLane are available at <<https://www.fastlane.nsf.gov/a1/newstan.htm>>.

Submission of Signed Cover Sheets. For purposes of this solicitation, the signed paper copy of the proposal Cover Sheet (NSF Form 1207) should be forwarded to NSF within five working days following proposal submission in accordance with FastLane proposal preparation and submission instructions referenced above. Two separate NSF Budget Form 1030s should also be forwarded to NSF at the same time. They should detail the system acquisition cost and the cost to operate the system.

PROPOSAL REVIEW INFORMATION

A. Merit Review Criteria.

Reviews of proposals submitted to NSF are solicited from peers with expertise in the substantive area of the proposed research or education project. These reviewers are selected by Program officers charged with the oversight of the review process. NSF invites the proposer to suggest, at the time of submission, the names of appropriate or inappropriate reviewers. Care is taken to ensure that reviewers have no conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic organizations, minority serving institutions or adjacent disciplines to that principally addressed in the proposal.

As with all proposals to NSF, these proposals will be reviewed against the following general merit review criteria established by the National Science Board. Following each criterion are potential considerations that the reviewer may employ in the evaluation. These are suggestions and not all will apply to any given proposal. Each reviewer will be asked to address only those that are relevant to the proposal and for which he/she is qualified to make judgments.

Criterion I: What is the intellectual merit of the proposed activity?

- How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields?
- How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of prior work.)
- To what extent does the proposed activity suggest and explore creative and original concepts?
- How well conceived and organized is the proposed activity?
- Is there sufficient access to resources?

Criterion II: What are the broader impacts of the proposed activity?

- How well does the activity advance discovery and understanding while promoting teaching, training, and learning?
- How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)?
- To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding?
- What may be the benefits of the proposed activity to society?

PI's should address the following elements in their proposal to provide reviewers with the information necessary to respond fully to both NSF merit review criteria. NSF staff will give these factors careful consideration in making funding decisions.

Integration of Research and Education

One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learner perspectives.

Integrating Diversity into NSF Programs, Projects, and Activities

Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities -- are essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

Additional Review Criteria

Proposals for this solicitation will be further subject to four, more specific, criteria dealing with the ability of the proposer to meet the objective of acquiring, placing, operating, maximizing usefulness and efficiency, and providing access to a terascale system. These additional criteria parallel the required points that must be included in any submitted proposal. While all will be considered, these criteria are listed in priority order (with the first being the most important.)

1. Can the proposed system be expected to provide the necessary computational capability required to generate new, breakthrough, scientific discoveries? Proposed systems will be evaluated in terms of overall performance on scientific applications of interest to NSF researchers, not solely in terms of peak performance. (e.g., applications reported in the May

1998 panel on Terascale Applications workshop at NSF

<http://www.interact.nsf.gov/cise/conferences.nsf/acir_workshops?OpenView>, or those “large” usage applications dealt with by the NRAC

<http://www.npaci.edu/Allocations/Meeting_results/NRAC_999_awards.html>. Is there sufficient access to both physical and intellectual resources? Can the proposed system be delivered in a timely manner? It is expected that by February 2001 at least a portion of the system will be installed and in either full production or friendly user mode with an acceptable timetable in place for completion of the full production system. Full system availability at an early date is preferred to the later delivery of an even larger system.

2. What is the history of the vendor/supplier in supplying high-performance systems? Does the proposed system have a high likelihood for continued success and growth?
3. What is the procedure for ensuring the system (and possible upgrades) will be available for use by the national computational research community? Is the plan for implementation and support of the system viable? What are the qualifications/experience of the PI and the proposing organization in regard to managing a resource for national use? How does the proposed system relate to those at other sites in delivering high-end services to the national research community? What arrangements will be made with the existing PACI sites?
4. What is the total cost to NSF of the proposed system, including operations? What is the cost effectiveness of the total planned system and its operations? Overall cost effectiveness of the proposed activity is an important consideration for all proposals submitted under this solicitation.

B. Review Protocol and Associated Customer Service Standard

External panels using the criteria identified in this solicitation will review proposals. Panelists will be chosen from academia, the private sector, the national laboratories, and other government agencies. They will have expertise in areas of high-performance computing necessary to evaluate the proposals received, including computational science, computer science, and scientific disciplines representative of the target user community. Organizations submitting proposals deemed to have sufficient merit will be site visited and the resulting site visit reports will be a critical part of the deliberations of the final panel.

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. A program officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation. NSF will be able to tell applicants whether their proposals have been declined or recommended for funding within six months for 95 percent of proposals. The time interval begins on the proposal deadline or target date or from the date of receipt, if the program does not use deadlines or target dates. The interval ends when the division director accepts the program officer's recommendation.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy

implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with an NSF Program officer. A principal investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants Officer does so at its own risk.

AWARD ADMINISTRATION INFORMATION

A. Notification of the Award.

Notification of the award is made *to the submitting organization* by a Grants Officer in the Division of Grants and Agreements (DGA). Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program Division administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator.

B. Grant Award Conditions.

An NSF grant consists of: (1) the award letter, which includes any special provisions applicable to the grant and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable grant conditions, such as Grant General Conditions (NSF GC-1)* or Federal Demonstration Partnership Phase III (FDP) Terms and Conditions* and (5) any NSF brochure, program guide, announcement or other NSF issuance that may be incorporated by reference in the award letter. Electronic mail notification is the preferred way to transmit NSF grants to organizations that have electronic mail capabilities and have requested such notification from the Division of Grants and Agreements.

* These documents may be accessed electronically on NSF's Web site at: <<http://www.nsf.gov/>>. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone 301.947.2722 or by e-mail from pubs@nsf.gov.

Cooperative agreement awards also are administered in accordance with NSF Cooperative Agreement Terms and Conditions (CA-1).

More comprehensive information on NSF Award Conditions is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, (NSF 95-26) available electronically on the NSF Web site. The GPM also is available in paper copy by subscription from the Superintendent of Documents, Government Printing Office, Washington, DC 20402. The GPM may be ordered through the GPO Web site at: <<http://www.gpo.gov/>>. The telephone number at GPO for subscription information is 202.512.1800.

C. Reporting Requirements.

For all multi-year grants (including both standard and continuing grants), the PI must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period.

Within 90 days after expiration of a grant, the PI also is required to submit a final project report. Approximately 30 days before expiration, NSF will send a notice to remind the PI of the requirement to file the final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for that PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

NSF has implemented a new electronic project reporting system, available through FastLane, which permits electronic submission and updating of project reports, including information on: project participants (individual and organizational); activities and findings; publications; and, other specific products and contributions. Reports will continue to be required annually and after the expiration of the grant, but PIs will not need to re-enter information previously provided, either with the proposal or in earlier updates using the electronic system.

Effective October 1, 1999, PIs are required to use the new reporting system for submission of annual and final project reports.

D. New Awardee Information.

If the submitting organization has never received an NSF award, it is recommended that the organization's appropriate administrative officials become familiar with the policies and procedures in the NSF *Grant Policy Manual* which are applicable to most NSF awards. The "Prospective New Awardee Guide" (NSF 99-78) includes information on: Administrative and Management Information; Accounting System Requirements and Auditing Information; and Payments to Organizations with NSF Awards. This information will assist an organization in preparing documents that NSF requires to conduct administrative and financial reviews of an organization. The guide also serves as a means of highlighting the accountability requirements associated with Federal awards. This document is available electronically on NSF's Web site at: <<http://www.nsf.gov/cgi-bin/getpub?nsf9978>>.

CONTACTS FOR ADDITIONAL INFORMATION

General inquiries should be made to the Division of Advanced Computational Infrastructure and Research, Room 1122, National Science Foundation, Arlington, VA 22230, Dr. Robert Borchers, Division Director, telephone (703) 306-1970, e-mail: rborcher@nsf.gov; Dr. Richard Hirsh, Deputy Division Director, telephone (703) 306-1970, e-mail: rhirsh@nsf.gov; Dr. Stephen Elbert, Program Officer, Room 1122,

telephone (703) 306.1963, e-mail: selbert@nsf.gov. For questions related to use of FastLane, contact Elaine Washington, (703) 306-1963, e-mail: eputney@nsf.gov.

OTHER PROGRAMS OF INTEREST

The NSF Guide to Programs is a compilation of funding for research and education in science, mathematics, and engineering. General descriptions of NSF programs, research areas, and eligibility information for proposal submission are provided in each chapter. Many NSF programs offer announcements concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSF program offices listed in Appendix A of the GPG. Any changes in NSF's fiscal year programs occurring after press time for the Guide to Programs will be announced in the NSF Bulletin, available monthly (except July and August), and in individual program announcements. The Bulletin is available electronically via the NSF Web Site at <<http://www.nsf.gov>>. The direct URL for recent issues of the Bulletin is <<http://www.nsf.gov/od/lpa/news/publicat/bulletin/bulletin.htm>> Subscribers can also sign up for NSF's Custom News Service to find out what funding opportunities are available.

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YEAR 2000 REMINDER

In accordance with Important Notice No. 120 dated June 27, 1997, Subject: Year 2000 Computer Problem, NSF awardees are reminded of their responsibility to take appropriate actions to ensure that the NSF activity being supported is not adversely affected by the Year 2000 problem. Potentially affected items include: computer systems, databases, and equipment. The National Science Foundation should be notified if an awardee concludes that the Year 2000 will have a significant impact on its ability to carry out an NSF funded activity. Information concerning Year 2000 activities can be found on the NSF web site at <http://www.nsf.gov/oirm/y2k/start.htm>.

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